

### Data Accuracy

The SSF contains point spread function (PSF) weighted estimates of surface, cloud properties, and radiances obtained from the higher-resolution, coincident, imager pixels over CERES footprints. The imager pixels must be correctly located within the footprint and properly weighted to correctly determine their contribution to the scene the CERES footprint is viewing. This step is accomplished by dividing that portion of the viewed area which has an integral PSF weight of 95% of the theoretical total into uniform angular bins, averaging the pixel parameters within each bin, and then using a PSF weighted average of the bin parameters to determine the footprint parameter values.

To evaluate the accuracy of the PSF weighting, the broadband unfiltered radiances are compared with the averaged PSF weighted VIRS narrowband radiances. There should be strong agreement in the linear relationship between the two. In addition to errors in location accuracy, this method also contains errors caused by the nonlinear relationship between broadband and narrowband radiances. The most representative spatial error would be the 2.1 percent window spectral band since coverage there is nearly coincident. Only crosstrack footprints for all sky conditions over ocean are used to minimize viewing geometry, surface, and atmospheric path differences. Very high correlation coefficients and small RMS errors were obtained as shown in Table 1. Over the eight months of TRMM data, no statistically significant trends could be identified in the regression slope coefficient. Any drift in the calibration of these different instruments is in the same direction.

Table 1: Uncertainty of Imager Convolution within CERES Footprint

<b>Spectral Band</b>	<b>Typical Value <math>\text{W m}^{-2}\text{sr}^{-1}</math></b>	<b>Regression RMS Error <math>\text{W m}^{-2}\text{sr}^{-1}</math></b>	<b>Regression Percent RMS Error</b>	<b>Correlation Coefficient</b>
SW	55	3.75	6.8%	0.996
LW-day	85	2.40	2.8%	0.987
LW-night	85	2.35	2.8%	0.985
WN	6.7b	0.14	2.1%	0.996
a. January 1 through August 31, 1998				
b. $\text{W m}^{-2}\text{sr}^{-1}\mu\text{m}^{-1}$				

### Validation Study Results

**Imager-Based Cloud Fraction:** On nine days, the CERES instrument was placed in along-track scan mode. This mode allows the same nadir scenes to be viewed at all viewing angles from 0 to 75 degrees. Since the imager pixels used would basically be the same for all these footprints (neglecting some crosstrack expansion), the mean cloud fraction percent by viewing zenith bins should not have a viewing zenith dependence. Our results show that this is true within 0.5% based on a mean of 53%.

**Aerosol Optical Thickness:** As part of the aerosol validation, the mean imager radiances and viewing zenith were used to obtain the AOT through look-up tables. There were never errors larger than 0.01 for either channel between the values calculated using SSF variables and the mean AOT on the SSF.

#### Quality Checks:

1. All imager-derived parameters are rejected if they are outside the range specified in the data product catalog. Parameters are almost never rejected for this reason.
2. When the ratio of weighted area of unknown to known cloud parameters exceeds 10:1, the cloud layer area and cloud properties are rejected. About 0.73% of these parameters are rejected.

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